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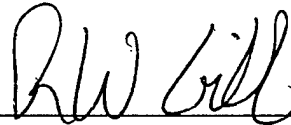## A THEORETICAL MODEL TO ATTACK THE ENEMY'S DECISION-MAKING PROCESS
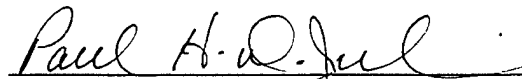
By

Randall W. Gibb

Major, USAF

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: _____

8 February 2000

Paul DiJulio, Lt Col, USAF
Faculty Advisor

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Abstract of

A THEORETICAL MODEL TO ATTACK THE ENEMY'S
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turn will produce decisions less favorable for the enemy.

A Theoretical Model to Attack the Enemy's Decision-Making Process

Since the idea for warfare is first devised in the minds of men, it is in the minds of men the seed of peace can first be sown.[1]

Would it be possible to provide carefully selected information to the enemy commander and convince him that failure is likely? Yes, it would be possible to alter the decision-making process of the enemy and consequently affect their ensuing actions. This would plant not only the seed of peace, but also the seed of failure in his mind. This warfare is of the informational-psychological kind, aimed at the enemy's command and control process. The goal, by manipulation, is to compel the enemy to behave as desired. Enemy behaviors may range from prompting to act when action leads to defeat or inhibiting an enemy's action and gaining victory by not fighting – the acme of skill.[2] The best manner to alter the minds of men and their thoughts on conflict is to dissuade those thoughts with the proper use of *information*.

An operational commander needs to know and understand human decision-making limitations. It allows for a better plan to attack the enemy and it may inhibit it from happening to himself. Information warfare (IW) is the primary method used to plan and employ attacks aimed at the decision-making process. Humans are susceptible to many biases and limitations when making decisions. An operational commander can attack his enemy by exploiting decision-making vulnerabilities. This may be the most effective and efficient manner to wage war in the new millennium. The enemy's decision-making is the, "…adversary's control point, it is here that the potential for leverage is greatest."[3]

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[1] Quote on wall at Navy War College Mahan passageway, Felix de Weldon.
[2] Sun Tzu, The Art of War, (Oxford University Press, 1963), 77.
[3] Gregory M. Schechtman, "Manipulating the OODA Loop: The Overlooked Role of Information Resource Management in Information Warfare," Defense Technical Information Center, Air Force Institute of Technology, AFIT/GIR/LAL/96D-10 (Dec 1996), 29.

Warfare has been described as a, "human social activity."[4] This paper centers on the social-cognitive relationship between an operational commander and an enemy commander/leader. It is a battle of wits between the two and they will both use intelligence data to make decisions faster and better than the other. This paper proposes a theoretical model to attack the decision-making process of the enemy. It steps through human perceptions, IW and command and control warfare (C2W) concepts, as well as decision-making models, the commander's estimate of the situation (CES) and the Observation-Orientation-Decision-Action (OODA) loop. This is followed by a discussion on information processing which introduces biases and limitations humans have when making decisions. The paper then comes full-circle relating CES and OODA loop with human biases, introducing a theoretical planning model for the operational commander.

Perception & Information

Perception *is* reality. An enemy must perceive that failure is inevitable; the sooner the better. Taking this construct to the extreme, the ultimate victory is to convince the enemy prior to the start of armed conflict, that they will be *un*successful. If a country knows they will lose before engaging in the first battle, certainly they would not participate in the bloodshed to begin with -- this is the paradox of war.[5] "If one could determine winners in advance, it wouldn't be necessary to compete in order to validate previous analysis."[6]

The traditional view of warfare defines success as the defeat of the enemy's primary fighting force. However, success is also dependent upon the leadership admitting defeat. The leadership making this decision is not physically beaten but their *will* to continue the

[4] Richard Szafranski, "A Theory of Information Warfare: Preparing for 2020," <//132.60.140.12/airchronicles/apj/szfran> (16 December 1999), 5.
[5] Grant T. Hammond, "Paradoxes of War," Joint Force Quarterly, Spring 1994.
[6] Ibid., 9.

battle is. Thus, the enemy decides to capitulate and their behavior is modified to the wishes of the victor. Hammond, in his article, "The Paradox of War," relates the enemy's will and the decision-making process, "we may destroy an enemy's will not by defeating armies or leveling factories but by convincing him that it is not in his self-interest to fight."[7]

During the planning phase of an operation, often the priority is on the destructive capabilities of weapons. Recently however, war-fighting has become an "effects-based" analysis. General Fogleman discussed the need to assess this new metric of measuring "effects" in asymmetric war.[8] Furthermore, a discussion of effect-based warfare naturally leads to the consideration of psychological effects resulting from IW. This paradigm shift needs to depart the destructive "bang for the buck" mentality of tangible weapons, to "psych for the bang" thinking; thus, maximizing effects on enemy leadership and modifying their behavior to our demands.[9]

Information Warfare

It is in the minds of men that decisions are made on how to battle. Those decisions are based upon information. Human senses are continuously inundated with information. Perceptual cognition provides the ability to capture, filter, and make sense of the world. One can look but not see. One can see only what one expects, but not what is truly there. However, taken within proper context and based upon experience and expectation, information can become more than simply data; information is a perceptual gestalt.[10]

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[7] Hammond, 15.
[8] Ronald R. Fogleman, "Advantage USA: Air Power and Asymmetric Force Strategy," Air Power History, Summer 1996.
[9] Jay M. Kreighbaum, "An Indirect Approach to Warfare: Attacking an Enemy's Moral Forces," (Unpublished Research paper, Air Command and Staff College, Air University, Maxwell AFB: 1997), 50.
[10] Gestalt is a psychological concept meaning that the whole is greater than the sum of the individual parts.

Information systems related to an enemy or ourselves can be described as, "...a comprehensive set of the knowledge, beliefs, and decision-making processes."[11] Information warfare is defined by Joint Pub 3-13.1 as, "actions taken to achieve information superiority by affecting adversary information, information-based processes, information systems, and computer-based networks while defending one's own...."[12] C2W is an application of IW in military operations and consists of five elements, two of which are psychological operations (PSYOPS) and military deception integrated with intelligence to target enemy command and control.[13] All discussions of command and control center on processing information faster than the enemy, consequently speeding-up the decision cycle and giving the advantage to the operational commander which can best employ IW.[14] This paper advocates expansion of traditional PSYOPS and deception planning.

Joint Doctrine for C2W recognizes the potential of information aimed at decision-makers:

> Effective C2W provides the joint force commander (JFC) the ability to shape the adversary commander's estimate of the situation in the theater of operations. It may even be possible to convince an adversary that the US has "won" prior to engaging in battle, resulting in deterrence and preempting hostilities.[15]

This description of joint operations stresses the perceptual manipulation of the enemy's leadership. Shaping the CES drastically alters the enemy's ability to properly maintain operational awareness and make effective decisions. This potential needs to be exploited even more today, due to the declining military presence of the U.S. around the world and the country's anxiety over casualties. If technological/information superiority can create a

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[11] Szafranski, 1.
[12] Joint Chiefs of Staff, Joint Doctrine for Command and Control Warfare (Joint Pub 3-13.1) (Washington, D.C.: February 7, 1996), GL-8.
[13] Ibid., v.
[14] Ibid., vi.
[15] Ibid., I-5.

perception that the ensuing events will result in certain failure for an enemy, it needs to be flaunted. Hammond further emphasizes this point, by stating:

> Modulating an adversary's perception is critical. Creating illusion – or misconception – so he may deceive himself is the highest act of the military art. To have him decide not to undertake a course of action that is not in your interest (by having him see it is not in his) is the penultimate use of diplomacy and force in pursuit of national objectives – subduing an enemy without fighting him.[16]

By altering the enemy's knowledge and beliefs, the decision-making process is consequently affected. Thus, the aim is to not only *slow* the enemy's information process relative to your own, which is the aim of current doctrine, but to get "in" their circle by injecting data, which is *perceived to be reliable* information.

To do this at the operational level one must crawl inside the enemy's mind and determine what is the desired end state. Hence, regressive planning will reveal steps needed to achieve the strategic and operational objectives. With the plan of the adversary known, certain bits of information may convince the enemy commander to question his own success at achieving that desired end state.

> The aim of information warfare activities at the operational level is to so complicate or confound the adversary's decision making process that the adversary cannot act or behave in a coordinated or effective way…the adversary makes decisions that result in actions that consistently support our aims by consistently failing to support the adversary's aims.[17]

Psychological Operations are defined as, "planned operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning and, ultimately, the behavior of foreign government, organizations, groups or individuals."[18] The description of PSYOPS focuses IW on "selected" targets and their "objective reasoning," to influence decision-making and reduce the will to fight. Often

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[16] Hammond, 11.
[17] Szafranski, 4.

the concept of PYSOPS produces images of dropping leaflets and loudspeaker announcements. However, the potential effects of PSYOPS can be much greater when properly integrated with the operational commander's planned attack on decision-making.

Military deception is defined by Joint Pub 3-13.1 as, "actions executed to mislead adversary military decisionmakers as to friendly military capabilities, intentions, and operations, thereby causing the adversary to take specific actions (or inactions) that will contribute to the accomplishment of the friendly mission."[19] Joint Pub 3-13.1 further explains that deception actions, "...should focus on causing the adversary commander to estimate incorrectly the situation in the operational area..." in terms of capabilities, positions, and intentions.[20] Ambiguity and misdirection are two approaches used in military deception.[21] The target of military deception is the enemy commander and the objective is to influence the decisions made prior to and during the operation.[22]

Successful military deception must be perceived by the adversary as plausible and reinforce that which is already known to be true.[23] The emphasis is on the *enemy's perspective*. Getting inside the mind of the enemy and understanding human decision-making truly makes war a social activity. Hence, the intelligence community and state department staff must become early players in the operational planning steps to properly educate planners about the enemy's knowledge and belief systems.

Note that every discussion thus far has centered on different aspects of the same topic: decision-making. Decisions are at the heart of all operations and whether it is

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[18] Joint Chiefs of Staff, GL-11.
[19] Ibid., GL-9.
[20] Ibid., II-4.
[21] M. R. Critz, "Operational Deception," Naval War College, (Joint Military Operations Department, September 1996) 4.
[22] Ibid., 4.

approached from IW, C2W, PSYOPS, or military deception, understanding how humans make decisions is vital as an operational planner plans for success.

<div align="center">

Decision-Making

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Commander's Estimate of the Situation

When planning operations for military actions, commanders, regardless of their ethnic/cultural background, all follow some common basic procedures enroute to the making a decision. An operational decision, is defined as, "…what the command as a whole will do to accomplish the mission."[24] This is a macro-view of the decision-making process. Each step builds upon previous steps and culminates into a plan of action. Often planning articles discuss how PSYOPS and military deception can be incorporated into *our* planning process. However, the adversary also has some system of planning and it is in the enemy's planning and decision cycle that an attack can be concentrated.

An assumption will be made that an enemy will follow a format of macro-planning that is similar to how the Department of Defense plans for contingencies, called the commander's estimate of the situation (CES). This is a very broad picture and provides decision-making steps enroute to the final decision, the final course of action (COA). Below lists seven steps to a generic CES:

1. Mission Analysis
2. Analysis of Factors Affecting Possible Courses of Action
3. Enemy Courses of Action
4. Own Courses of Action
5. Analysis of Enemy Courses of Action and Own Courses of Action
6. Comparison of Own Courses of Action
7. The Decision[25]

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[23] Eugene B. Price, "Intelligence, Deception and Operational Surprise," (Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1993), 4.

[24] Milan Vego, On Operational Art, (The United States naval War College, Joint Military Operations Department 1999), 453.

[25] "Commander's Estimate of the Situation," (Joint Military Operations Department, September 1998), 2.

An enemy may not follow this exact approach to planning and decision-making, but it does help to focus efforts to attack particular stages and identify types of information needed. The earlier in the process information exploitation occurs, the better. If decision-making is manipulated in steps one and two, then the ensuing decisions made further down the process are going to be tainted.

An area especially vulnerable is the second step, analysis of factors affecting possible courses of action. It is in this stage that space/time/force capabilities are evaluated. The digestion of information and resulting decisions play a vital role in determining the final COA. The importance of this step creates the need for an operational planner to attack the enemy at this point in the process. Consequently, when developing the COA, the enemy will be working with manipulated information and will be unable to develop accurate and realistic plans, thus giving away the advantage long before shots are fired. In this sense, it may act as an operational fire for the joint force commander.

The CES is not just simply a static, planning tool. A modified version of it can represent a dynamic, heat-of-the-battle decision-making process. For instance, during actual operations, commanders still must determine COAs based upon current situations, given space/force/time factors relative to the mission. Thus, a macro-planning model also becomes a macro-action, decision-making model.

Observation-Orientation-Decision-Action

This decision-making model encompasses individual characteristics. It is more descriptive in breaking down the process of *how* an action occurs. This is a dynamic, reactive model, which centers on properly evaluating the battle-space environment and

incorporates a commander's situational awareness (SA). This is called the Observation-Orientation-Decision-Action (OODA) loop.

Joint Pub 3-13.1 describes the decision cycle that is applicable to all C2 systems. It can model either individual or group processes. Whereas CES was primarily prior to the operation, the OODA loop can be used to establish battle-space SA before and during the action. The JP 3-13.1 specifically details the model in relation to a commander and his staff as follows:

1. *Observation*: gathering information from reconnaissance, surveillance, and target acquisition (RSTA).

2. *Orientation*: observation information is converted into intelligence by the staff. Based upon the enemy's status and known friendly status, an assessment of the "reality" of the operational area.

   - This "reality" is based on capabilities, personnel, equipment, weather, morale, and casualties.

   - *Since these sources of input are imperfect and subject to manipulation by the opposing side, the commander's assessment of "reality" will invariably be something other than actual "reality."*

3. *Decision*: military decision based upon the assessment of the "reality" of the operational area. This decision is then communicated to subordinate commanders.

4. *Action*: execution of the above decision.[26]

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[26] Joint Chiefs of Staff, A-1 – A-2.

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                    OBSERVATION
                 ↗               ↘
        ACTION                      ORIENTATION
                 ↖               ↙
                    DECISION
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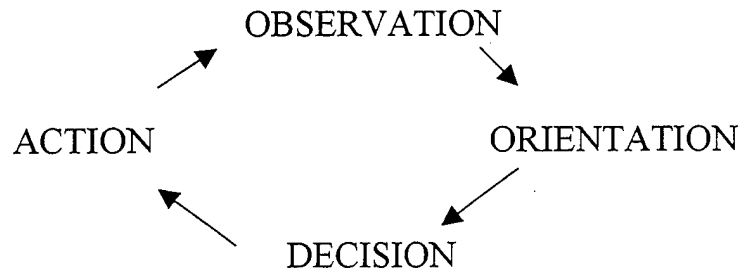
Figure 1. The OODA loop

This is a dynamic and ever-evolving cycle. The action stage has immediate effects,

either positive or negative. A feedback loop of the action results in a new observation

perception. This changes the "orientation" stage and the "perceived reality" that the

operational commander views. This cycle is occurring at all levels of command and by the

enemy simultaneously. The size of the circle can imply speed of the decision and "consistent

with classic military doctrine, the commander that can gather and process information and

initiate action to affect the theater of operations quickest will have a decided military

advantage."[27]

The above describes the OODA loop in terms of an operational commander. It can be

tailored to model the decision making process of an individual at the lowest echelon or a

group at the highest level. Regardless, the concept of the model remains the same: observing

the environment's myriad of stimuli and making sense of the stimuli within both the internal

and external contexts. Internal, in this sense, means past experience and personal

expectations or "baggage" one brings to decisions while external, is the context within which

the information is presented. Joint Pub 3-13.1's description however, omits necessary

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[27] Joint Chiefs of Staff, A-1 – A-2.

cultural aspects in the orientations stage. This is vital to properly assess how best to credibly manipulate information for the enemy's consumption.

In a paper entitled, "Manipulating the OODA loop: The overlooked role of information resource management in information warfare," Schechtman investigated the OODA loop and an information processing model based upon the concepts of information resource management. He advocated using IW to quicken friendly OODA loops and decision-making, while only hinting at the enemy's decision-making process. This paper builds on Schechtman's work but takes the concepts *against the enemy* and employs a different information processing model aimed at the enemy's planning process.

Targeting the Decision-Making Process

The major area of interest in the OODA loop is the Joint Pub 3-13.1's description of the orientation stage and the vulnerability of a commander assessing the situation and forming an accurate "reality" picture. This very statement within the pages of Joint Pub 3-13.1 is what this paper has been building upon and will continue to address. Aspects of IW, PSYOPS, and military deception discuss enemy decision-making, yet fail to address the manner in which to exploit it.

According to Milan Vego, "...penetrating the mind of the enemy commander is perhaps the single most important element for success at the operational level."[28] The groundwork has been put forth as to the importance of doing this, now the discussion turns to the theoretical *how*. The process an enemy takes to make decisions can be subject to misinformation and misleading data that may negatively affect the conduct of operations. Information warfare can attack the process and thereby affect the will of the enemy during

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[28] Vego, 453.

the observation and orientation stages in the OODA loop. These OODA loops occur at every stage of the CES process. Consequently, the ensuing decisions and actions will be contrary to the enemy's best interest.

Research conducted on the decision-making process of aircraft cockpit crews is similar in many ways to that of operational commanders. They are both based on group dynamics, temporal limitations, and stress. Good decision-making is characterized by four elements: 1) situational awareness (SA), 2) metacognition (the ability to know how to plan and use available sources of information), 3) shared mental model (communication is essential), and 4) resource management.[29] Most vulnerable to attack are SA and a shared mental model. Any military leader or a planning staff member can have their SA altered from reality due to misinformation. Consequently, the sharing of any one individual's "manipulated" SA can modify the final, agreed upon battle-space model and hamper effective/efficient decision-making. Dominant battlefield awareness (DBA) and operational vision are two terms used in operational art to link SA and mental model development.[30]

Humans are constantly attempting to construct a mental model of the world. This mental model is continuously updated to match new incoming environmental cues with prior and expected experiences. That is why it is key to good decision-making *and* vulnerable to attack. Wickens and Flach define perception as, "...the association of meaning to stimuli," and explain the circular relationship, "the mental model is shaped by perceptions and perceptions in turn are shaped by the mental model."[31] Thus, the importance of shaping and manipulating the enemy's environmental cues are necessary to further influencing perception

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[29] Judith M. Orasanu, "Decision-Making in the Cockpit," in Aviation Psychology ed. Randall W. Gibb (McGraw-Hill Companies, Primis Custom Publishing, 1998), 79-80.
[30] Vego.

and battle-space awareness. Groups of people working on a war-planning staff do the same. All planners have expectations based on previous war-gaming exercises and experiences, as well as their own interpretations of incoming stimuli (reading the intelligence reports). Thus, a group of planners prior to or during an engagement, are all forming their own individual mental model and an agreed upon group mental model.

Wickens and Flach propose an information processing model.[32] Their model was originally intended to describe human psychological and physiological processes. Their model relates sensory perception, short and long-term memory, and response selection. However, it can also be related to commanders and their decision-making because the same concepts of stress and task saturation are experienced when commanders establish an informational cue. This is especially true as the operational commander becomes involved with Network Centric Warfare (NCW). Their model describes information processing stemming from intake of the stimuli in the senses, followed by pattern recognition of vast amounts of stimuli, decision and response selection, and then execution and feedback. Using this model to better understand how information is processed, human weaknesses can be exploited against the enemy. Below compares the stages of processing between the OODA loop and Wickens and Flach's model.

Observation	=	Short-term sensory store
Orientation	=	Pattern recognition
Decision	=	Decision and response selection
Action	=	Response execution

The observation and orientation stages are the primary targets. It is in these first two stages that humans are most vulnerable to information attack. In the observation stage

[31] Christopher d. Wickens and John M. Flach, "Information Processing," in Aviation Psychology ed. Randall W. Gibb (McGraw-Hill Companies, Primis Custom Publishing, 1998), 25.
[32] Ibid.

numerous data-points reach the senses, are filtered, and somewhat organized prior to processing. Filtering information is the best way to ensure it is not perceived. The simple withholding of information from the enemy is the starting point of this planning model. Also, in this first stage of observation, channelized attention or tunneling can occur. This is best described as fixating on particular bits of incoming stimuli and not attending to others. Stress usually causes this to occur, but it can also occur if salient information appears. Thus, all attentional resources are focused on the new, unique information and the other, less interesting, but still pertinent stimuli is ignored. In information processing models, it is emphasized that, "perceptual processes are often limited by the supply of attention resources."[33] This is a complicated way to state operational commanders cannot deal with all of the information that is available to them. It must be condensed, filtered, summarized, or highlighted.

The orientation stage is where the knowledge of the enemy comes into play. Knowing the adversary's culture is necessary because it allows understanding of their values and actions. It must be stressed that this is a psychological, information warfare attack on our enemy's decision-making process. Consequently, the theory must be grounded in psychological research.

Wickens and Flach propose three heuristics, or short cuts, that humans use when making decisions:

1. *Confirmation bias*: Seek and find information that confirms a hypothesis that is already believed to be true.

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[33] Wickens and Flach, 20.

2. *Availability bias*: Hypothesis considered most likely if it is most available in memory (most recently experienced and/or planned for).

3. *As-if heuristic*: Treating all information sources as if they were of equal reliability or failing to devalue those information sources of lower reliability to a reasonable extent.[34]

When considering how best to "attack" the enemy, one should focus on these aspects of the enemy's decision-making process during the orientation stage. For example, if intelligence reports hint that the enemy erroneously believes an attack will occur at beachhead A, have the planning staff continue to plant information which further leads the enemy to come to that decision. The plan will "feed" into the confirmation bias – seeking and finding information which supports the initial, gut-feeling hypothesis.

The availability bias can be exploited by knowing that the enemy has been accomplishing training exercises in support of defeating a particular type of attack. Once planning begins, it can be assumed that the enemy will expect the battle plan to match what they have been training against. This may result from a recent experience and expectation. This is the origin of "script writing." This often happens when an opponent projects their culture and way of fighting a war incorrectly onto their enemy.

The "as if" heuristic can be exploited by saturating the enemy with different sources of information. These may or may not conflict with each other, but their existence could possibly force the enemy to fail to discount certain items and improperly weigh other cues. Another result of this heuristic is failing to discount the additional cues' reliability. The "as-

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[34] Wickens and Flach, 29-30.

if" heuristic also incorporates the limited ability humans have when dealing with probabilities, since information is of a probabilistic nature.[35]

The Final Model

Figure 2 is the final planning model that incorporates the concepts of this paper. The model is a combination of basic CES, OODA loop, and human information processing model limitations/characteristics. Note that the OODA loop occurs in each and every stage of the CES because every decision-making process involves the OODA loop. That is why the emphasis of the model implies attacking the first two stages of the OODA loop. Thus, it will indirectly affect later stages of the decision-making process, by altering knowledge and beliefs, as well as mental-model development.

Again, it is stressed that these ideas can be applied against either an individual leader or a group of planners. Also, these concepts are applicable to all levels of warfare. They are not simply limited to large, force-on-force conventional operations. From guerrillas to terrorism and civil war peacekeeping, all adversaries make decisions. The trend in world conflict has been U. S. forces and allies against a single leader (Saddam, Bin Laden, and Milosovich). This would imply that a war-fighting plan that attacks an enemy's decision-making process is even more realistic and needed due to the ability to focus efforts against one person. Attacking the decision-making process will not become extinct with the future advancement of technology. In fact, operational commanders, as well as strategic planning could integrate these concepts into an NCW plan.

The model is a theoretical one, not a historical one. This was intentionally done to educate operational commanders of human limitations, rather than analyze past deception

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[35] Wickens and Flach, 31.

COAs. Historical examples of military deception analyze what worked at a particular point in time, given specific operational situations. For example, the classic deceptions used in WWII by the Allies before Normandy and the Germans before Ardennes, too often create attempts to imitate.[36] Historical models focus efforts of planers to reinvent past success. A theoretical model, in contrast, educates *how* and *why*, leaving the specific *what* to the imagination of the planner.

Conclusion

This paper built upon the concept that human decision-making processes are vulnerable to attack. In describing the perceptual limitations and the need to attack the intangible will of humans, this model is necessary and vital. If these informational-psychological attacks are properly aimed at the enemy's command and control they may exploit the weaknesses and biases which reside in the human decision-making process.

The Observation and Orientation stages of the OODA loop are the specific targets of this psychological attack. It is possible to "aim" specific information at the enemy commander and alter his decision making process. It needs to be emphasized that Joint Pub 3-13.1 states that inputs (Observation stage) can be exploited and that information can alter the "reality" (Orientation stage) of a commander. This paper proposes a model for the successful planning to accomplish that. However, future research needs to address incorporating this theoretical model into NCW to assist planners, while simultaneously ensuring their own decisions are not being manipulated by the enemy.
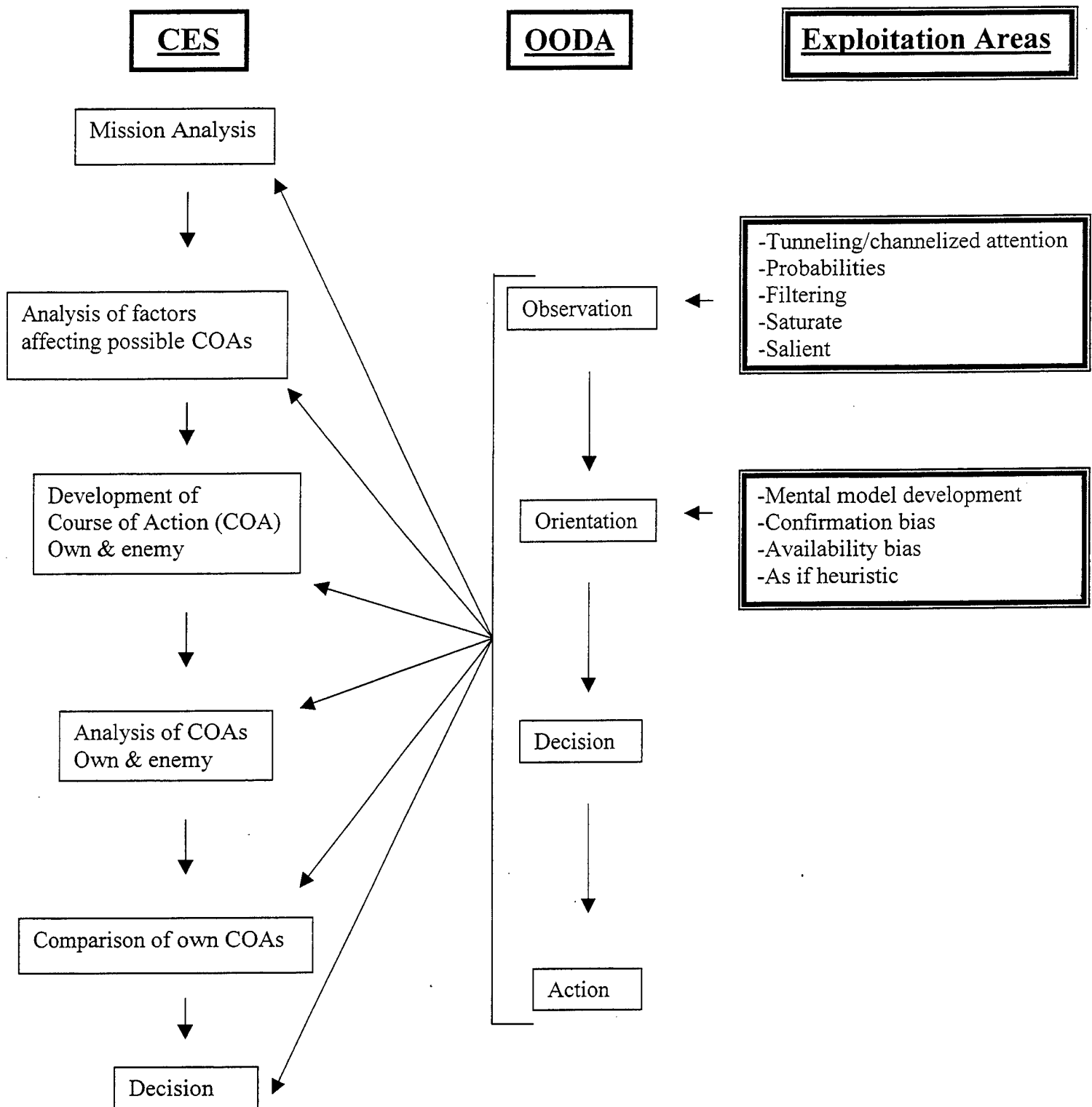
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[36] Critz.

CES

Mission Analysis

Analysis of factors
affecting possible COAs

Development of
Course of Action (COA)
Own & enemy

Analysis of COAs
Own & enemy

Comparison of own COAs

Decision

OODA

Observation

Orientation

Decision

Action

Exploitation Areas

-Tunneling/channelized attention
-Probabilities
-Filtering
-Saturate
-Salient

-Mental model development
-Confirmation bias
-Availability bias
-As if heuristic

Figure 2. Theoretical planning model.

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